PETROPHYSICAL DATA INTEGRATION GEP011

COURSE DESCRIPTION

This interactive training course will highlight the importance of data integration from a variety of sources to address complex reservoir evaluation and productivity challenges experienced throughout the full asset life cycle. The course will cover a variety of data sources, fundamentals of reservoir characterization, and methodologies of integrating key information. It combines theory with practical exercises to give participants a working knowledge of how integrating available data at various scales can be used to evaluate reservoir quality, heterogeneity and improve the productive potential to maximize recovery of hydrocarbons.

COURSE GOAL

To enhance the participants' knowledge, skills, and abilities necessary to understand how to integrate available data at various scales and how to use these integrated data to evaluate reservoir quality, heterogeneity and improve the productive potential to maximize recovery of hydrocarbons.

COURSE OBJECTIVES

By the end of this course, participant will be able to:

- Determine the benefits of data integration.
- Determine various sources of data and the purpose of data acquisition.
- Plan data acquisition programs and oversee core handling and preservation techniques.
- Understand the role of routine and special core analysis in reservoir characterization.
- Deduce reservoir properties from log interpretation and core analysis.
- Integrate reservoir and well data to provide an evaluation of the reservoir and characterize flow units.
- Avoid common pitfalls of data acquisition and analysis.
- Appropriately present and manage data.

WHO SHOULD ATTEND

- Geologists
- Well Site Geologists
- Petrophysicists
- Reservoir Engineers
- Production Engineers
- Drilling Engineers
- Data Managers
- Oil and Gas Industry Professionals involved in logging data interpretation and validation

COURSE DURATION

5 Working Days

COURSE OUTLINES

1. Introduction and Reservoir Properties
    - Overview of the need for integrated data analysis – advantages and disadvantages
    - Overview of the various data types and sources (well log, core and fluid samples etc)
    - Refresh rock properties (porosity and permeability)
    - Basic Fluid properties
    - Pressure and temperature gradients
2. Data Acquisition and Description
    - Wireline logs – an overview of key log types including gamma ray, spontaneous potential, resistivity, caliper, Neutron-density and image logs.
        - Acquisition planning
        - Best practice for log data
    - Coring – an overview of whole and sidewall core logging
        - Acquisition planning
        - Core handling and preservation – core orientation
        - Best practice for core data
    - Formation Tests – MDT and RFT
        - Acquisition planning
3. Data Preparation
    - Core Data
        - QC core data and bias check
        - Preliminary zonation determination
        - Routine Core Analysis (RCA)
        - Special Core Analysis (SCAL)
    - Log Data
        - Log preparation audit and normalization, data conditioning
        - Environmental corrections
        - Lithostratigraphic and chronostratigraphic correlation
    - Log and Core synchronization – lag determination, logging cuttings and core to correlate with the log suite

- Well Test Interpretation
  - Drill stem testing – reservoir scale fluid pressure and mobility, fluid return and flow dynamics
  - Wireline and LWD formation testing – fluid extraction, downhole chemical analysis, sample return, mobility and flow dynamics
  - Pressure transient analysis

4. **Integration of Data, Analysis and Interpretation**
   - Core Analysis
     - Core description and logging
     - Integration of RCA with core
     - Assimilation of SCAL techniques to evaluate capillary pressures, wettability, petrophysical properties (m, n), saturations, permeability, rock strength, stress / strain
   - Log Analysis
     - Basic Log Analysis – compute Vsh, porosity, Sw, K, Netpay
     - Common pitfalls of basic log analysis
   - Well test interpretation to assess well productivity and production issues
     - Integrate well tests and production logging data
     - Determination of hydrocarbons in place
     - Water and gas coning effects
     - Contact evaluation

5. **Data Presentation, Sensitivity Studies and Next Steps**
   - Data set pitfalls
     - Resolution of lateral and vertical heterogeneity
     - Scaling issues between reservoir field scale (DST), logging scale and detailed laboratory testing.
   - Managing Uncertainty
     - Recalculation sensitivity studies – evaluating existing studies
     - Effects of uncertainty on In Place volumes
   - Reporting of results
   - Data presentation and database management
     - Data formats for integration
     - Data hierarchy
   - Next steps
     - Integration of core, log and test data for use in reservoir modelling
     - Further analysis options